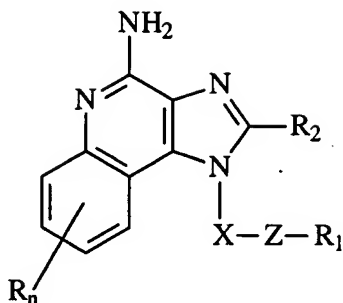


WHAT IS CLAIMED IS:

1. A compound of the formula (I):



(I)

wherein: **X** is $-CHR_3-$, $-CHR_3$ -alkyl-, or $-CHR_3$ -alkenyl-;

Z is $-S-$, $-SO-$, or $-SO_2-$;

R₁ is selected from the group consisting of:

- alkyl;
- aryl;
- heteroaryl;
- heterocyclyl;
- alkenyl;
- $-R_4$ -aryl;
- $-R_4$ -heteroaryl;
- $-R_4$ -heterocyclyl;

R₂ is selected from the group consisting of:

- hydrogen;
- alkyl;
- alkenyl;
- aryl;
- heteroaryl;
- heterocyclyl;
- alkyl-Y-alkyl;

- alkyl-Y- alkenyl;
-alkyl-Y-aryl; and
- alkyl or alkenyl substituted by one or more substituents selected
from the group consisting of:

5

-OH;
-halogen;
-N(R₃)₂;
-CO-N(R₃)₂;
-CO-C₁₋₁₀ alkyl;
10 -CO-O-C₁₋₁₀ alkyl;
-N₃;
-aryl;
-heteroaryl;
-heterocyclyl;
15 -CO-aryl; and
-CO-heteroaryl;

10

15

each R₃ is independently H or C₁₋₁₀ alkyl;

R₄ is alkylene or alkenylene;

Y is -O- or -S(O)₀₋₂;

20

n is 0 to 4; and

each R present is independently selected from the group consisting of C₁₋₁₀
alkyl, C₁₋₁₀ alkoxy, hydroxy, halogen and trifluoromethyl;
or a pharmaceutically acceptable salt thereof.

25

2. A compound of claim 1 wherein Z is -S-.

3. A compound of claim 1 wherein Z is -SO₂-.

4. A compound of claim 1 wherein R₁ is -alkyl.

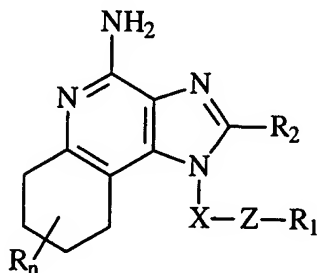
30

5. A compound of claim 4 wherein R₁ is -methyl.

6. A compound of claim 1 wherein R₁ is aryl.
7. A compound of claim 1 wherein R₁ is heteroaryl.
- 5 8. A compound of claim 1 wherein X is $-(CH_2)_{2-6}-$.
9. A compound of claim 1 wherein R₂ is H.
- 10 10. A compound of claim 1 wherein R₂ is $-alkyl-O-alkyl$.
11. A compound of claim 1 wherein R₂ is $-alkyl$.
12. A compound selected from the group consisting of:
 - 2-butyl-1-[4-(phenylthio)butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 15 2-butyl-1-[2-(phenylthio)ethyl]-6,7,8,9-tetrahydro-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-butyl-1-[4-(phenylsulfonyl)butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-butyl-1-[4-(methylthio)butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-butyl-1-[4-(methylsulfonyl)butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 1-[2-(phenylthio)ethyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 20 1-[4-(phenylsulfonyl)butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 1-[4-(methylsulfonyl)butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 1-[4-(phenylthio)butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 1-[4-(methylthio)butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-butyl-1-[5-(methylsulfonyl)pentyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 25 2-methyl-1-[5-(methylsulfonyl)pentyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-ethyl-1-[5-(methylsulfonyl)pentyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 1-[5-(methylsulfonyl)pentyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-hexyl-1-[5-(methylsulfonyl)pentyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-(2-methoxyethyl)-1-[5-(methylsulfonyl)pentyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 30 2-butyl-1-[5-(methylthio)pentyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-butyl-1-[5-(methylsulfinyl)pentyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-butyl-1-[3-(methylsulfonyl)propyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine; and

2-butyl-1-[3-(phenylsulfonyl)propyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
or a pharmaceutically acceptable salt thereof.

13. A compound of the formula (II)



(II)

wherein: X is -CHR₃-, -CHR₃-alkyl-, or -CHR₃-alkenyl-;

Z is -S-, -SO-, or -SO₂-;

R₁ is selected from the group consisting of:

-alkyl;

-aryl;

-heteroaryl;

-heterocyclyl;

-alkenyl;

-R₄-aryl;

-R₄-heteroaryl; and

-R₄-heterocyclyl;

R₂ is selected from the group consisting of:

-hydrogen;

-alkyl;

-alkenyl;

-aryl;

-heteroaryl;

-heterocyclyl;

-alkyl-Y-alkyl;

-alkyl-Y-alkenyl;

-alkyl-Y-aryl; and

- alkyl or alkenyl substituted by one or more substituents selected from the group consisting of:

- OH;
- halogen;
- N(R₃)₂;
- CO-N(R₃)₂;
- CO-C₁₋₁₀ alkyl;
- CO-O-C₁₋₁₀ alkyl;
- N₃;
- aryl;
- heteroaryl;
- heterocyclyl;
- CO-aryl; and
- CO-heteroaryl;

each R₃ is independently H or C₁₋₁₀ alkyl;

R₄ is alkylene or alkenylene;

Y is -O- or -S(O)₀₋₂;

n is 0 to 4; and

each R present is independently selected from the group consisting of C₁₋₁₀ alkyl, C₁₋₁₀ alkoxy, hydroxy, halogen and trifluoromethyl; or a pharmaceutically acceptable salt thereof.

14. A compound of claim 13 wherein Z is -S-.

15. A compound of claim 13 wherein Z is -SO₂-.

16. A compound of claim 13 wherein R₁ is -alkyl.

17. A compound of claim 16 wherein R₁ is -methyl.

18. A compound of claim 13 wherein R₁ is aryl.

19. A compound of claim 13 wherein R₁ is heteroaryl.
20. A compound of claim 13 wherein X is $-(CH_2)_{2-6}-$.
- 5 21. A compound of claim 13 wherein R₂ is H.
22. A compound of claim 13 wherein R₂ is $-alkyl-O-alkyl$.
23. A compound of claim 13 wherein R₂ is $-alkyl$.
- 10 24. A compound selected from the group consisting of:
 - 1-[5-(methylsulfonyl)pentyl]-2-propyl-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-methyl-1-[3-(methylthio)propyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-methyl-1-[3-(methylsulfonyl)propyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 15 2-ethyl-1-[3-(methylthio)propyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-ethyl-1-[3-(methylsulfonyl)propyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-methyl-1-[4-(methylthio)butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-methyl-1-[4-(methylsulfinyl)butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-ethyl-1-[4-(methylthio)butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 20 2-ethyl-1-[4-(methylsulfonyl)butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 1-[4-(methylsulfonyl)butyl]-2-propyl-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-butyl-1-[4-(methylsulfinyl)butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-methyl-1-[2-(methylthio)ethyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-methyl-1-[2-(methylsulfonyl)ethyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 25 2-methyl-1-[4-(methylsulfonyl)butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-ethyl-1-[2-(methylsulfonyl)ethyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 1-[2-(methylsulfonyl)ethyl]-2-propyl-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-butyl-1-[4-[(2,4-difluorophenyl)thio]butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 2-butyl-1-[4-[(2,4-difluorophenyl)sulfonyl]butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
 - 30 2-butyl-1-[4-(ethylsulfonyl)butyl]-1*H*-imidazo[4,5-*c*]quinoline-4-amine;
 - 2-butyl-1-[4-[(1,1-dimethylethyl)thio]butyl]-1*H*-imidazo[4,5-*c*]quinoline-4-amine;
 - 2-butyl-1-[4-[(4-fluorophenyl)thio]butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;

- 2-butyl-1-{4-[(4-fluorophenyl)sulfonyl]butyl}-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
2-ethyl-1-{4-[(1-methylethyl)thio]butyl}-1*H*-imidazo[4,5-*c*]quinoline-4-amine;
1-{4-[(3,5-dichlorophenyl)thio]butyl}-2-ethyl-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
1-[4-(cyclopentylsulfonyl)butyl]-2-ethyl-1*H*-imidazo[4,5-*c*]quinoline-4-amine;
5 1-{4-[(3,5-dichlorophenyl)sulfonyl]butyl}-2-ethyl-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
1-[4-(cyclohexylthio)butyl]-2-ethyl-1*H*-imidazo[4,5-*c*]quinoline-4-amine;
1-[4-(butylthio)butyl]-2-ethyl-1*H*-imidazo[4,5-*c*]quinoline-4-amine;
1-{4-[(4-chlorophenyl)thio]butyl}-2-ethyl-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
1-[4-(butylsulfonyl)butyl]-2-ethyl-1*H*-imidazo[4,5-*c*]quinoline-4-amine;
10 2-ethyl-1-{4-[(4-fluorophenyl)thio]butyl}-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
2-ethyl-1-{4-[(1-methylethyl)sulfonyl]butyl}-1*H*-imidazo[4,5-*c*]quinoline-4-amine;
2-ethyl-1-[4-(ethylthio)butyl]-1*H*-imidazo[4,5-*c*]quinoline-4-amine;
2-ethyl-1-[4-(ethylsulfonyl)butyl]-1*H*-imidazo[4,5-*c*]quinoline-4-amine;
1-[4-(cyclohexylsulfonyl)butyl]-2-ethyl-1*H*-imidazo[4,5-*c*]quinoline-4-amine;
15 2-butyl-1-{2-[(1-methylethyl)sulfonyl]ethyl}-1*H*-imidazo[4,5-*c*]quinoline-4-amine;
2-butyl-1-[2-(phenylsulfonyl)ethyl]-1*H*-imidazo[4,5-*c*]quinoline-4-amine;
2-butyl-1-{2-[(4-fluorophenyl)sulfonyl]ethyl}-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
2-butyl-1-{2-[(1,1-dimethylethyl)sulfonyl]ethyl}-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
2-butyl-1-{2-[(1,1-dimethylethyl)thio]ethyl}-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
20 2-butyl-1-[2-(propylsulfonyl)ethyl]-1*H*-imidazo[4,5-*c*]quinoline-4-amine;
2-butyl-1-[2-(propylthio)ethyl]-1*H*-imidazo[4,5-*c*]quinoline-4-amine;
2-butyl-1-{2-[(2-methylpropyl)sulfonyl]ethyl}-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
2-butyl-1-{2-[(2-methylpropyl)thio]ethyl}-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
2-butyl-1-[2-(ethylsulfonyl)ethyl]-1*H*-imidazo[4,5-*c*]quinoline-4-amine;
25 2-butyl-1-[2-(ethylthio)ethyl]-1*H*-imidazo[4,5-*c*]quinoline-4-amine;
2-butyl-1-[2-(methylsulfonyl)ethyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
2-methyl-1-[6-(methylsulfonyl)hexyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
1-[5-(phenylsulfonyl)pentyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
1-[5-(methylsulfonyl)pentyl]-2-(trifluoromethyl)-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
30 2-(2-methoxyethyl)-1-[5-(phenylsulfonyl)pentyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
2-ethyl-1-[4-(pyrimidin-2-ylthio)butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;
2-ethyl-1-[4-(pyrimidin-2-ylsulfonyl)butyl]-1*H*-imidazo[4,5-*c*]quinolin-4-amine;

2-methyl-1-[4-(methylsulfonyl)butyl]-6,7,8,9-tetrahydro-1*H*-imidazo[4,5-*c*]quinolin-4-amine;

2-methyl-1-[5-(methylsulfonyl)pentyl]-6,7,8,9-tetrahydro-1*H*-imidazo[4,5-*c*]quinolin-4-amine;

5 2-methyl-1-{4-[(1-methylethyl)sulfonyl]butyl}-6,7,8,9-tetrahydro-1*H*-imidazo[4,5-*c*]quinolin-4-amine;

2-methyl-1-{4-[(4-fluorophenyl)sulfonyl]butyl}-6,7,8,9-tetrahydro-1*H*-imidazo[4,5-*c*]quinolin-4-amine; and

10 2-methyl-1-{4-[(1,1-dimethylethyl)sulfonyl]butyl}-6,7,8,9-tetrahydro-1*H*-imidazo[4,5-*c*]quinolin-4-amine;

or a pharmaceutically acceptable salt thereof.

25. A pharmaceutical composition comprising a therapeutically effective amount of a compound of claim 1 and a pharmaceutically acceptable carrier.

15

26. A pharmaceutical composition comprising a therapeutically effective amount of a compound of claim 12 and a pharmaceutically acceptable carrier.

20 27. A method of inducing cytokine biosynthesis in an animal comprising administering a therapeutically effective amount of a compound of claim 1 to the animal.

28. The method of claim 27 wherein the cytokine is IFN- α .

25 29. A method of treating a viral disease in an animal comprising administering a therapeutically effective amount of a compound of claim 1 to the animal.

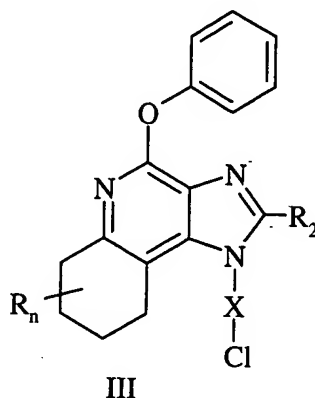
30. A method of treating a neoplastic disease in an animal comprising administering a therapeutically effective amount of a compound of claim 1 to the animal.

30 31. A method of inducing cytokine biosynthesis in an animal comprising administering a therapeutically effective amount of a compound of claim 12 to the animal.

32. The method of claim 31 wherein the cytokine is IFN- α
33. A method of treating a viral disease in an animal comprising administering a therapeutically effective amount of a compound of claim 12 to the animal.
- 5 34. A method of treating a neoplastic disease in an animal comprising administering a therapeutically effective amount of a compound of claim 12 to the animal.
- 10 35. A pharmaceutical composition comprising a therapeutically effective amount of a compound of claim 13 and a pharmaceutically acceptable carrier.
36. A method of inducing cytokine biosynthesis in an animal comprising administering a therapeutically effective amount of a compound of claim 13 to the animal.
- 15 37. The method of claim 36 wherein the cytokine is IFN- α .
38. A method of treating a viral disease in an animal comprising administering a therapeutically effective amount of a compound of claim 13 to the animal.
- 20 39. A method of treating a neoplastic disease in an animal comprising administering a therapeutically effective amount of a compound of claim 13 to the animal.
40. A pharmaceutical composition comprising a therapeutically effective amount of a compound of claim 24 and a pharmaceutically acceptable carrier.
- 25 41. A method of inducing cytokine biosynthesis in an animal comprising administering a therapeutically effective amount of a compound of claim 24 to the animal.
42. The method of claim 41 wherein the cytokine is IFN- α .
- 30 43. A method of treating a viral disease in an animal comprising administering a therapeutically effective amount of a compound of claim 24 to the animal.

44. A method of treating a neoplastic disease in an animal comprising administering a therapeutically effective amount of a compound of claim 24 to the animal.

5 45. A compound of the formula (III):



wherein: X is $-\text{CHR}_3-$, $-\text{CHR}_3\text{-alkyl-}$, or $-\text{CHR}_3\text{-alkenyl-}$;

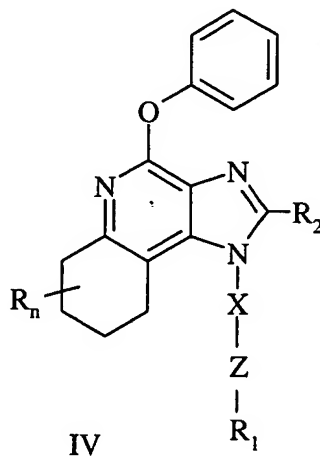
R₂ is selected from the group consisting of:

- 10 -hydrogen;
 -alkyl;
 -alkenyl;
 -aryl;
 -heteroaryl;
15 -heterocyclyl;
 -alkyl-Y-alkyl;
 - alkyl-Y- alkenyl;
 -alkyl-Y-aryl; and
 - alkyl or alkenyl substituted by one or more substituents selected
20 from the group consisting of:
 -OH;
 -halogen;
 -N(R₃)₂;
 -CO-N(R₃)₂;
25 -CO-C₁₋₁₀ alkyl;

5
 -CO-O-C₁₋₁₀ alkyl;
 -N₃;
 -aryl;
 -heteroaryl;
 -heterocyclyl;
 -CO-aryl; and
 -CO-heteroaryl;

each R₃ is independently H or C₁₋₁₀ alkyl;
 Y is -O- or -S(O)₀₋₂;
 10 n is 0 to 4; and
 each R present is independently selected from the group consisting of C₁₋₁₀ alkyl, C₁₋₁₀ alkoxy, hydroxy, halogen and trifluoromethyl;
 or a pharmaceutically acceptable salt thereof.

15 46. A compound of the formula (IV):



wherein: X is -CHR₃-, -CHR₃-alkyl-, or -CHR₃-alkenyl-;
 Z is -S-, -SO-, or -SO₂;
 20 R₁ is selected from the group consisting of:
 -alkyl;
 -aryl;
 -heteroaryl;
 -heterocyclyl;

-alkenyl;
 -R₄-aryl;
 -R₄-heteroaryl; and
 -R₄-heterocyclyl;

5 **R₂** is selected from the group consisting of:

-hydrogen;
 -alkyl;
 -alkenyl;
 -aryl;
 10 -heteroaryl;
 -heterocyclyl;
 -alkyl-Y-alkyl;
 -alkyl-Y-alkenyl;
 -alkyl-Y-aryl; and
 15 -alkyl or alkenyl substituted by one or more substituents selected
 from the group consisting of:

 -OH;
 -halogen;
 -N(R₃)₂;
 20 -CO-N(R₃)₂;
 -CO-C₁₋₁₀ alkyl;
 -CO-O-C₁₋₁₀ alkyl;
 -N₃;
 -aryl;
 25 -heteroaryl;
 -heterocyclyl;
 -CO-aryl; and
 -CO-heteroaryl;

each **R₃** is independently H or C₁₋₁₀ alkyl;
 30 **R₄** is alkylene or alkenylene;
 Y is -O- or -S(O)₀₋₂;
 n is 0 to 4; and

each **R** present is independently selected from the group consisting of C₁₋₁₀ alkyl, C₁₋₁₀ alkoxy, hydroxy, halogen and trifluoromethyl; or a pharmaceutically acceptable salt thereof.

- 5 47. A compound of claim 1 wherein Z is -SO-.
48. A compound of claim 13 wherein Z is -SO-.